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When minds migrate: conceptualising spirit possession

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Abstract

To investigate possible cognitive factors influencing the cross-cultural incidence of spirit possession concepts and to develop a more refined understanding of the precise contours of 'intuitive mind-body dualism' (Bloom 2004), two studies were conducted that explored adults' intuitions about the relationship between minds and bodies. Specifically, the studies explored how participants reason about the effects of a hypothetical mind-migration across a range of behaviours. Both studies used hypothetical mind-transfer scenarios in which the mind of one person ("Beth") is transferred into the body of another person ("Ann"). Participants were asked to reason about the new post-transfer person's behaviours and aptitudes. In Study 1, participants (N=25) were provided with a scale on which they indicated their answers; in Study 2, participants (N=26) responded to open-ended questions. In both studies, the majority of participants reasoned that while the post-transfer person's performance on physical tasks (e.g. sprinting) would be similar to the host (i.e. Ann) performance on mental tasks (e.g. story-telling) would be similar to the person whose mind has been transferred (i.e. Beth). Further, participants tended to assume a complete displacement of minds, such that the post-transfer person's performance on mental task items was reasoned to be *identical* to incoming person's performance normally. The relevance of these findings for explaining the variable incidence and spread of difference possession concepts is discussed.

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Keywords

Spirit possession, intuitive mind-body dualism, social cognition, cultural transmission, Brazil.

When was the last time you were accused of being “out of your mind” or even having “lost your mind”? When did you last feel “beside yourself” with worry or fear? One would be well-advised not to take such statements too literally, of course, but they appreciably capture what may be described as basic assumptions and expectancies about persons, minds and bodies. If your “mind has gone”, it is generally assumed that, but for an empty physical shell, there is not much of “you” left. It takes both mind and body to compose a person, and it is mind – more than body – that captures your character, your personality, the *you* behind your eyes. Of course, a monist reflecting upon this statement would consider it rather misguided – mind is body, mind is matter, mind is ultimately a manifestation of brain material. Yet, recent experimental findings on our intuitive dualistic tendencies suggest that bodies losing minds (and vice-versa) is something that we readily conceive of and generate inferences from (Bloom 2004). Likewise, the migration of minds among bodies is a readily entertained notion in everyday life. Did the thought ever occur to you that by combining that person’s mind in that other person’s body you would have created your Mr/Ms Right? Perhaps not, but while such notions – and the kinds of comedic novels and films that they inspire – may form readily and spread rapidly without requiring much belief, ‘real’ examples of migrating agencies are found in many cross-culturally recurrent ideas about the afterlife, soul loss, and possession by spirits.

Recent experimental research on intuitive dualism can inform cognitive explanations of the emergence, transmission and persistence of these widespread forms of religious thinking. This research has established that from infancy intentional agents are represented and reasoned about differently from non-agentive matter and objects (Bloom 2004; see also Gopnik, Meltzoff and Kuhl 1999). As young children we have more than a rudimentary understanding that bodies obey the laws of physics while minds operate according to the rules of social engagement. If you want me to clean up my plate, you can either force the food down my throat or you can kindly encourage me to eat up. The former achieves the result via brute physical force, the latter appeals to my will through interpersonal negotiation and the engagement of mental capacities. Our early emerging appreciation of the divergent sets of causes and effects in our physical and social worlds spawns a radical dualistic perspective on persons – that is, we naturally see bodies and minds as occupying distinct domains, and even as autonomous and potentially separable from one another.

Most of the research on folk notions about minds and bodies has been conducted within developmental psychology, investigating a wide range of questions about agency-detection, theory of mind and object perception. This research provides a rich picture of the ways in which early emerging intuitions about our world – both social and physical – and the mechanisms and processes that underpin them, constrain and support the generation, communication and memorability of certain kinds of concepts throughout the lifespan. However, many questions remain for those of us who seek to account for the form and spread of concepts that are clearly informed by these cognitive mechanisms and processes, but that perhaps challenge even more fundamental assumptions about the composition of minds, bodies and persons. For example, if it is intuitive to conceive of souls or minds as

floating free of any physical laws of cohesion and contact, is the possibility that an individual may have two, three, four or more souls readily entertained? Perhaps we can easily represent the transfer, fusion and fission of minds. Are persons most readily represented as constituting one mind and one body, as the research on dualism seems to assume, or can we equally readily conceive of a body housing numerous minds simultaneously, any or all of which may be active at any given moment? Representations of multiple, transferred, or fused minds may constitute fertile cradles for the generation of rich inferences in real-time social cognition, or they may constitute only theoretical glosses that do little conceptual work.

These questions are perhaps less obvious for those investigating the development of core cognitive mechanisms than for those seeking to identify the broad set of cognitive constraints on the cultural transmission of a potentially very extensive range of concepts about persons, souls, minds and bodies. We do not need to flick too far through the anthropological record before encountering many instances of concepts that posit bodies with temporarily borrowed minds, multiple minds in one body, one mind shared across numerous bodies simultaneously or no mind in a (still alive) body. Might these be meaningful counter-examples to what have been proposed as pan-human natural tendencies? For instance, their commonality may suggest that one mind-one body thinking is not all that “core” after all.

Somewhat contrary to the usual method by which anthropological challenges to claims about universal tendencies are laid out, we will not proceed to list numerous examples of mind-body beliefs that “demonstrate” without further ado the futility of universalist theories about

human thought and culture. Below we present the findings of two experimental studies designed to probe further the nature of dualistic thinking, in particular to identify the constraints that dualistic thinking operates within.

Our research agenda stems from a number of observations raised by the ethnographic literature on spirit possession and mediumship. A cursory glance through this literature reveals many different varieties of possession belief. The reported configurations of minds and bodies in space and time, and the contexts in which possession phenomena arise, appear so variable that one may be led to doubt the existence of any important cross-cultural regularities. Nevertheless, deeper analysis reveals that the range of possession beliefs that may be encountered cross-culturally rest upon dualistic assumptions, particularly that minds (or spirits) are separable from bodies. Further, despite the presence of a wide variety of concepts of possession (and the theoretical potential for many more that apparently do not exist in the ethnographic record), there is one in particular that appears significantly more frequently than any other. This possession concept entails the complete displacement of a single agency by another, such that a bodiless agent effectively acquires the body – but not the mind – of a physical being. Given the cross-cultural recurrence of this concept, the particular mind-body configuration that differentiates this possession concept from others could reflect contours of intuitive mind-body dualism upon which it and much other religious and everyday thinking rests. Investigating possession concepts, therefore, can potentially generate important discoveries about the precise nature of intuitive mind-body dualism and how it constrains thinking about our social world.

Concepts of possession

Beliefs about possession, and the often dramatic spectacles that surround its practice, have captured the attention and imagination of observers and writers for centuries. One of the earliest anthropological records of possession is given by Sir James Frazer in his classic work, *The Golden Bough*. He writes,

The belief in temporary incarnation or inspiration is world-wide. Certain persons are supposed to be possessed from time to time by a spirit or deity; while the possession lasts, their own personality lies in abeyance; the presence of the spirit is revealed by convulsive shiverings and shakings of the man's whole body, by wild gestures and excited looks, all of which are referred, not to the man himself, but to the spirit which has entered into him; and in this abnormal state all his utterances are accepted as the voice of the god or spirit dwelling in him or speaking through him. ([1890] 1958: 108)

Since Frazer's time, a great wealth of ethnographic data has accrued on possession beliefs and practices around the world. These phenomena vary along many different dimensions and the behaviours, contexts, interpretations, representations, and practices associated with possession are exceedingly more complex and diverse than Frazer's short description might suggest. Excited looks and convulsions, for instance, are not invariably part and parcel of temporary possession behaviour in all, or perhaps even a significant majority, of possession contexts. The variable recurrence of particular features of possession-trance behaviour cross-culturally is certainly a subject ripe for ethnographic and historiographical investigation and precise measurement and theorising. But what of possession concepts and definitions? What,

if any, are the most frequently occurring concepts of possession throughout the cross-cultural record? What, if any, are the constraints operating on the ways in which possession may be conceived of, on the inferences that may be generated from these concepts, and on how possession concepts may be encoded and recalled, and transmitted to others?

Before turning to our experimental research, let us briefly consider the key findings of Cohen's ethnographic research on the range of spirit possession concepts found among a single group of mediums in Brazil. For the sake of brevity, we emphasise participant statements rather than offer lengthy descriptions of observed behaviours witnessed by the anthropologist.² Together with existing ethnography on the subject of possession, these data have triggered fundamental empirical questions about the form and spread of diverse notions about persons, minds and bodies, and have guided the generation of predictions tested here.

Cohen conducted her research during eighteen months in 2002-4 among a group of Afro-Brazilian religionists in the northern Brazilian city of Belém. The physical nucleus of the group is the *terreiro*, the venue for daily possession, healing and ritual ceremonies, and the dwelling place of the group's leader (the *pai-de-santo*) and a rolling total of around 5 initiated practitioners (*filhos-de-santo*). A core of 20 members frequented ceremonies – both public and private – , social gatherings and business meetings, with numbers swelling to 60-plus attendants at larger events. Neighbours, clients, relatives and friends added to the core membership on these occasions, with spirit possession occupying a central place in proceedings. “Direct contact with the gods”, the *pai-de-santo* once stated in an interview, “and

² A more comprehensive and balanced account is offered elsewhere (Cohen, in press).

the preparation of the body so that these gods could return to manifest themselves and offer advice is the supreme point (*ponto máximo*) of Afro-Brazilian religion (*culto afro*)". The term "gods" was not often used by informants in such contexts, but rather the more inclusive term "entities" (*entidades*), which may be understood broadly to encompass deities believed to be of West African origin, such as *orixás* and *voduns*, as well as the spirits of European explorers, statesmen, and warriors, and *caboclo* spirits indigenous to the Amazonian interior.³

To start our brief analysis of concepts about possession, permit us to begin with a lengthy quotation. The statement, given by the *pai-de-santo*, was collected during a meandering conversation that had drifted onto the topic of materials used in the first days of an initiation ceremony. The initiate is physically and spiritually prepared via a series of rituals during a period of reclusion, as the son (*filho*) or daughter (*filha*) of an *orixá*. Becoming a son/daughter of an *orixá* (*filho/a-de-santo*) has multi-dimensional significance for the various people taking part (most centrally the initiator and initiate), but, in general, one crucial objective of the prescribed series of rituals is the preparation of the initiate to receive, or incorporate (*incorporar*), his/her *orixá* deity. The initiate's *orixá-de-cabeça*, or 'orixá of the head', is discovered prior to the period of initiation through divination techniques. The ritual exegesis presented below begins to hint at the complexities that characterise certain concepts of possession in this Afro-Brazilian tradition, contrasting starkly with Frazer's definition of possession above.

When you are going to begin your initiation [lit. "withdraw"], you have to bring a quartz bowl... It's a small bowl because you are still composing the *orixá*. In this bowl - to

³ See Cohen (in press) for a full description of the ethnographic context, including the various spirit families and deities that compose the pantheon of regular visitors to the *terreiro*.

which is added water that has been sprinkled over your head - some of your hair is stored... It's as if you were taking your DNA – they are important parts: hair, nails... All of this is put into the bowl so that you form the energy there that is going to give life to your personal *orixá*. It is in that bowl that you unite the cosmic *orixá* that you are going to season with your personal energy, which is going to form the *orixá* of your head. It's because of this that you often see 2 *orixás*, 2 Ogums [*the name of one of the orixás*] in one *terreiro* because that Ogum is in the head of one; he is composed of the cosmic energy of Ogum and your personal composition – it's as if I got some water from the Amazon River and put it in various glasses and in each glass I added sugar, lemon, etc. Is it water from the Amazon? Yes! But each one has its own taste according to whatever was added.

This is only the beginning. This nascent composition, a powerful and often “chaotic” energy, can possess the body of the initiate, and the body must be progressively prepared through mediumistic “development sessions” and ritual preparation of the physical ‘material’ (*matéria*) to accommodate and support this energy. Initial possessions are often brief and uncontrolled, and are said to take their toll on the *matéria* of the medium, who is often left feeling foggy and lethargic after a possession episode.

In the case of possession by the *orixás*, then, quite a different picture emerges from Frazer's description. Frazer's definition of temporary possession has three key features: 1) the spirit enters into the person, 2) the person's own personality lies in abeyance during the episode, and 3) all utterances are attributed to the spirit. Contrastingly, in the *culto* two essences are fused together – that of the cosmic, or prototype, *orixá* and that of the initiate – and it is this combination of essences or energies that forms the personal *orixá* that then possesses the

filho in the public ceremonies and animates the body to perform characteristic dances and bestow comfort and blessings on those gathered. Of course, the *displacement* model described by Frazer, whereby one agent replaces another and animates the borrowed body, would fly in the face of certain ‘facts of possession’ at least in the Afro-Brazilian context. As the *pai-de-santo* mentions, it is necessary for one to appreciate the composition of the “personal *orixá*” in order to understand how there may be two *orixás* of the same name in the same *terreiro*, possibly possessing two different mediums at the same time. Other important facts of possession are also explained by this ‘fusion’ model. Appreciating Ogum as a custom-made energy, rather than as a discreet, bounded, singular agent, enables one to understand why Ogum possessing person A is in many respects different to Ogum possessing person B; it also helps to explain why I should not expect Person C possessed by Ogum in *terreiro* C today to know what Person D possessed by Ogum in *terreiro* D yesterday discussed with me; furthermore, as the personal *orixá* is “fed” and “cultivated” through ritual activities and the essences are increasingly added to the bowl over the lifetime of the initiate, the initiate “develops” as a medium and possessions become more controlled and harmonious. This again explains why different mediums possessed with the ‘same’ *orixá* exhibit very different manifestations.

According to the *pai-de-santo*, in the case of other spirit entities, such as *caboclos*, who possess the *terreiro*’s mediums much more frequently than *orixás*, a similar fusion principle applies. These entities are rarely represented as energies and essences and are not born in an initiation ceremony. Rather, they are persons, who once lived on earth but who have passed into another dimension, either following biological death or – as is the case with a class of spirits called *encantados* – by passing through a “portal” to a plane, which is parallel to human

existence, known as the *encantaria*. The fusion takes place during the possession episode. As the *pai-de-santo* (possessed by a *caboclo* entity) once said when considering possession by such entities, “The caboclo or the entity ... is one thing in the *encantaria*, (s)he has his/her own personality. When (s)he possesses, (s)he becomes something different – (s)he becomes both him/her plus part of the *pai-de-santo*”. As with possession by *orixás*, then, possession behaviours are potentially attributable – at least in principle – to both spirit and medium simultaneously. In contrast to *orixá* possession, apparent simultaneous possession of two different people by the same entity is not explained with reference to the metaphorical cup of water, but is commonly judged not to be simultaneous possession at all – while the particular entity under question may indeed be possessing one of the mediums, another person claiming to be possessed by the same entity is said to be possessed by a messenger, or “ambassador” of that entity.

Before we move on to look at possession concepts reported across the anthropological record, it is important that we consider the statements of the *culto afro* membership more broadly. How do the members with less exposure to *culto* teachings conceive possession? On what points, if any, do these concepts diverge from and concur with those of the *terreiro* leader? Is there any consensus among the membership as a whole on their basic definitions of possession?

On the whole, if one discusses possession with anyone but the *culto* leader, one will hear a vastly different definition of possession to the fusion-of-essences account. This is the case even for those who are second-in-command to the *pai-de-santo* (according to the rigid hierarchical ranking system that distinguishes rank according to years since initiation). A

senior member clearly described possession as the joining of the body of the medium with the spirit of the entity. These two parts, he claimed, make up the new (possessed) person. Another senior ranking member described possession as the moment in which one's own spirit withdraws "and another spirit comes and throws him/herself into your body". Drawing a clear demarcation between medium and spirit, another member describes her possession episodes as follows: "I don't know where my spirit goes. I don't know. I only know that I switch off. I don't remain in me." Another person stated, "Possession for me is a state of unconsciousness... in which we are not answerable for our actions, our bodily movements ...we don't have control of our bodies anymore. It's the total loss of control of the body and the mind. Something else controls – it is the spiritual being". When possessed, one's own spirit is said to "lie down", "journey to the other world", "dream", "sleep", or "remain watching". The entities are said to "take control", "dominate the mind", or "command the body and the mind". If you are unaware that someone is possessed and refer to the person by name, the spirit will correct you with "I am not [medium's name], I am [entity's name]". All behaviours during the possession episode are attributable to the entity possessing the medium. Possessing entities are often quick to point out this distinction even when expressing an opinion. On a number of occasions, when the *pai-de-santo* was possessed, the entity possessing him, after offering his point of view on some issue, would quickly qualify his statements with "I don't know if the *pai-de-santo* would agree", clarifying for the interlocutor that medium and spirit remain two separate persons. These observations, along with the data gathered from more casual interaction with *culto* members, indicate the pervasiveness of notions about possession that assume the autonomy – not the fusion – of the "minds" of medium and spirit (Cohen, in press).

What is puzzling, however, is that the “displacement” definition so readily offered and employed by the majority of *culto* members exists at all. It potentially becomes untenable when confronted with the ‘facts of possession’ mentioned above, such as the variable performances of a particular spirit entity across different mediums. If Spirit A is an eloquent counsellor “in the head of” Person B, but is rowdy and abusive when possessing Person C, how can the complete displacement account be an adequate description of what happens with minds, spirits and bodies during possession? The fusion account is available to all members through regular teaching and guidance from the *terreiro* leader, yet displacement accounts characterise people’s thinking about possession, both within the inner *culto* circle, and in the wider population of the city that has no *culto* affiliation whatsoever. It is only in response to the abstract, analytical questioning of the anthropologist – and perhaps not so well-intentioned sceptics of the *culto* – that the wider membership considers how the displacement principle may be modified to account for behaviours and activities that appear to contradict it.⁴ Even then, the questioner is routinely referred to the *pai-de-santo* as a probable source of reliable information on such issues.

Surveying the ethnographic literature, it immediately becomes apparent that the ‘principle of displacement’ guides possession concepts in many different cultural contexts. Frazer’s short

⁴ This is not to say that such contradictions are not apparent to one’s informants. Logical inconsistencies may even be puzzled over, but that this is normally in response to the ethnographer’s questioning does not by itself suggest that these informants operate with a radically different representation of ‘person’. It is theoretically possible that this population does not assume, for example, that persons (or spirits) have fundamentally continuous characters and personalities across time and space, and that therefore the ‘problem’ of the variability of a spirit’s behaviour across different mediums doesn’t actually exist. Yet, in eighteen months of intimate involvement with this community, the first author found no independent evidence to support this position. In fact, the following statement of one informant does indeed suggest the presence of a ‘problem’: “Ze Pelintra [*a spirit entity*], in the head of any other person that you see is totally different from when he is in the head of Pai [*the pai-de-santo*]... It’s totally different – he comes in the form of a vagabond [*malandro*], he is foul-mouthed, he comes smoking, drinking. This isn’t Seu Zé”. Note that here, rather than modify the possession concept, the informant questions the alleged ‘fact of possession’, suggesting that the latter Zé is not the true Zé as manifest in the *pai-de-santo*.

description, therefore, appears to capture the core of what may be a cross culturally recurrent concept. Herskovits similarly writes of the Haitians, “The supreme expression of their religious experience is a psychological state wherein a displacement of personality occurs when the god “comes into the head” of the worshipper. The individual thereupon is held to be the deity himself. He often exhibits a complete transformation in his personality; facial expression; motor behaviour, voice, physical strength, and the character of his utterances are startlingly different from what they were when he is “himself” (1948: 66-67). More recently, Stoller describes spirit mediumship among the Songhay of Niger as resulting “from the temporary displacement of a person’s double by the force of a particular spirit. When the force of the spirit enters the medium’s body, the person shakes uncontrollably. When the deity’s double is firmly established in the dancer’s body, the shaking becomes less violent. The deity screams and dances. The medium’s body has become a deity” (1989: 31). In his ethnography of Trinidadian ‘*orisha* work’, Kenneth Lum writes, “Since it was the spirit (the “actual you”) which animated the physical body, after an orisha had manifested on a person, it was that orisha who was now animating that person’s body... The displaced spirit only returned when the orisha had left” (2000: 156). In Mayotte, as in Belém, according to Lambek, spirits are said to “enter the bodies of human beings and rise to their heads, taking temporary control of all bodily and mental functions”. He continues, “Despite the fact that the body remains the same, it is now occupied by a different person... During the trance, the human host is absent, no one can say where, and is temporarily replaced by the spirit. Spirit and host are two entirely different persons” (1981: 40). Bourguignon explicitly considers the connection between displacement-of-control and responsibility and culpability: “[W]hen the spirits take over, women can do unconsciously what they do not permit themselves to do consciously. The demands that are made, the orders that are given, are

those of the spirits' doings and sayings. They are neither responsible for nor aware of what is going on and do not remember it after the fact. They have ultimate deniability" (2004: 572). While fusion accounts pepper the ethnographic record here and there, as well as other alternative descriptions, such as *oscillation* in which, for example, spirit and medium vie for control during a possession episode, displacement is by far the most pervasive description of possession. That a displacement conception of spirit possession is cross-culturally recurrent even when it appears incompatible with observers' experiences of possession (as in the case of the Afro-Brazilian *culto* in Belém), suggests cultural and environmental factors cannot fully account for this spirit possession conception. Perhaps a pan-human feature of normal human cognition underlies the recurrence of displacement. To investigate this possibility, we conducted a series of experiments concerning various aspects of the memorability, transmittability, and inferential potential of displacement, fusion and other concepts in mind-transfer situations. Two of these studies are reported below.⁵

The starting point of our research programme was to investigate the nature of (and possible patterns among) spontaneous inferences drawn from hypothetical mind transfer scenarios. Similar studies have been conducted among children in order to investigate developing conceptions of mind and brain (Johnson and Wellman 1982, Johnson 1990). However, these studies explicitly describe the mind (and brain, heart, face, mouth, etc.) transfer as a *transplant*, and participants are questioned about the potential effects of the transplant on the recipient's identity, physical attributes, and cognitive and behavioural tasks. A fundamental question for the purposes of our investigation is, when participants are asked to reason about a mind transfer, do they *spontaneously* infer that a transplant (i.e. a displacement) has

⁵ The results of further experiments are forthcoming (see Cohen and Barrett, submitted).

taken place? Is displacement a default assumption of mind transfer, owing to a one mind-one body tacit assumption? Alternatively, participants might, like the *pai-de-santo*, reason that as minds are anchored to bodies, the mind transferring into a body must fuse or oscillate with the resident host mind. But perhaps outside of a community that recognizes spirit possession or other mind-transfers, participants would have no consistent intuitions for reasoning about such an event and answer either arbitrarily or as if transfers make no difference in predicting an individual's behaviour. That is, if Person A's mind goes into Person B's body, do people assume that Person B will now behave as Person A, or as Person A plus Person B, or as Person B would normally (i.e. no effect)? If even people from outside a possession community exhibit a tendency toward reasoning in terms of a transplant for mind transfers, this would suggest that the widespread distribution of "displacement" interpretations of possession is, in part, attributable to implicitly held assumptions about persons as composed of one (bounded and impermeable) mind and one body. To explore these questions, we conducted the following two studies, each based on a hypothetical mind-transfer between two fictitious characters.

Study 1

Method

Participants.

Twenty-five undergraduate students (mean age, 20.0 years; 5 male, 20 female), mainly drawn from the School of History and Anthropology and the School of Psychology at Queen's University Belfast, Northern Ireland, participated in the study. All participants received monetary compensation for time and travel costs incurred (standard amount, £10).

Materials and Procedure.

Participants read 10 fictitious scenarios involving a hypothetical mind transfer between two characters, Ann and Beth. The scenarios provide some information about each of the girls across a range of activities, preferences and abilities. Participants are asked to reason about the abilities, preferences, etc. following a mind-transfer between the two girls. For example, the first scenario read as follows:

Ann is very good at maths. She regularly gets excellent marks on 7-point quizzes – usually around 6 out of 7 of her answers are correct.

Beth is very poor at maths. She regularly gets poor marks on 7-point quizzes – usually around 2 out of 7 of her answers are correct.

Once when the girls were in maths class, somehow Beth’s mind went into Ann’s body. How well do you think that the girl will do in the maths test?

Participants circled their response on a seven-point scale without anchors. As in the example above, each scenario offered a typical Beth behaviour and a typical Ann behaviour. These ‘anchors’ appeared at locations 2 and 6 on the seven-point scales, as described in the narratives, but were not labelled on the scales. Hence, the scales allowed for the possibility for participants to score the post-transfer behaviour as more extreme in either direction than Beth or Ann might be expected to behave without a mind transfer. Although all scenarios had a seven-point scale, different units of measurement were used across the various items (see Appendix). The item order, positive or negative value of the behaviours, and greater or lesser position on the scales was varied such that participants would not be able to use heuristics based on those considerations.

Space was provided for explanations of answers. An assortment of 5 “mental” and 5 control items were included on the response script. Control items consisted in behavioural judgments that hinge heavily upon physical and not mental aptitudes (e.g., weight lifting). In contrast, mental items were behavioural judgements not tightly anchored to particular physical attributes (e.g., maths competency). Table 1 lists the items and their orders. See Appendix for complete items.

<<Insert Table 1 about here>>

Item #	Control/Mental	Description	Measure
1	M	Maths aptitude	Test score
2	C	Appetite	Calories consumed in a day
3	M	Story-telling skill	Audience rating
4	C	Strength	Quantity of kgs lifted
5	M	Sociality	No. of people talked with during a party
6	C	Visual acuity	Rating on eye exam chart
7	C	Speed	Seconds to sprint 50 metres
8	M	Emotional expression	Time spent crying during a touching film
9	C	Cigarette smoking	Cigarettes smoked per day
10	M	Food preferences	Proportion of items selected

Table 1. Descriptions and measures of control and mental items used in the mind-transfer scenarios.

Assuming models of mind transfer are constructed wholly on the basis of cultural inputs unconstrained by regular cognitive structures, participants with little or no familiarity with possession or similar mind-transfer events would have no particular mental model of mind transfer on which to draw. Consequently, one might predict that these participants from Northern Ireland would adopt numerous ad hoc strategies yielding no detectable group pattern of answering. Mental items might be indistinguishable from control items.

Alternatively, if mind-transfer events are conceptualized through culturally invariable cognitive architecture pertaining to the relation of minds and bodies, participants in Northern Ireland would be expected to spontaneously employ a model of mind transfer similar to that observed in Brazil. Specifically, a displacement model for mental items would be favoured, yielding answers more similar to Beth (the incoming mind) than Ann (the host body).

Results and Discussion

Responses for each item were transformed to a Beth-Ann scale ranging from zero to one, with typical Beth responses equal to zero and typical Ann responses equal to one, and intermediate scores falling between and additive scores falling above or below. Hence, a half Beth-half Ann response would be expressed as 0.5 (e.g., a score of four on the maths example). A paired-samples t-test of the responses across all ten items yielded a significant difference between the five control, $M = .60$, $SD = .18$, and five mental items, $M = 0.14$, $SD = .16$, $t(24) = 8.25$, $p < .001$. One-sample t-tests comparing mean answers to 0.5 revealed that participants significantly favoured Beth-typical responses on mental items, $t(24) = 10.19$, $p < .001$; and Ann-typical responses on control items, $t(24) = 3.08$, $p = .005$.

These results strongly suggest that participants reasoned differently about the continuation of behaviours anchored to mental properties compared with behaviours more reliant on physical properties when considering the hypothetical mind transfer. When Beth’s mind went into Ann’s body, participants reasoned that this new ‘Beth-Ann’ would perform similar to Beth on mental tasks (e.g. storytelling), but similar to Ann on physical tasks (e.g. lifting weights).

Consider the contrast between two items both concerning eating behaviours. Item 2 asked participants to consider how “Beth-Ann’s”⁶ appetite would change after Beth’s mind entered Ann’s body, whereas item 10 concerned the particular foods preferred. Arguably, in folk reasoning appetite is more closely tied to biology than food preferences. A paired samples *t*-test showed a significant difference between participants’ reasoning about what foods Beth-Ann would want, $M = .08$, $SD = .21$, and what quantity of foods she would be likely to eat following the mind transfer, $M = .37$, $SD = .43$, $t(24) = 4.32$, $p < .001$. That is, appetite was scored as a blending of Beth and Ann, but food selection was wholly Beth’s decision (in Ann’s body).

Analyses of individual items revealed that all five mental items had lower means than any of the five control items. Table 2 lists the means and standard deviations for each item of each type.⁷

⁶ The tem “Beth-Ann” was not used in the scripts (see Appendix for details).

⁷ Note that items 2 and 9 yield the two lowest mean scores, reflecting possible mental-physical overlap on these items (i.e. appetite and smoking). Both items are commonly represented as having a strong physical component (e.g. stomach capacity or physiological dependence) as well as a psychological component (e.g. desire, appeal). This suggestion is supported by participant’s explanations for their responses (e.g. regarding appetite, “food

<<Insert Table 2 about here>>

	Item #	Mean	SD
Control	2	.45	.32
	4	.68	.33
	6	.89	.24
	7	.58	.34
	9	.39	.32
	<i>Group Mean</i>	<i>.60</i>	<i>.16</i>
Mental	1	.19	.34
	3	.07	.27
	5	.23	.30
	8	.13	.29
	10	.08	.21
	<i>Group Mean</i>	<i>.14</i>	<i>.18</i>

Table 2. Mean scores and standard deviations by item and by group (control and mental) for Study

1.

Although these scores indicate that participants treated the mind transfer as more dramatically impacting Ann’s mental behaviours as opposed to the control behaviours, the

intake is to do with both body and mind”, “there are both physical and mental reasons for diet”, “the mind controls hunger but for her body size, she may eat slightly more than usual”, “appetite is a combo of body needs for nutrients and personal desire. So the girl probably ate and average of the 2”.; regarding smoking, “the body may have craved more than usual but she may have had the urge in her head”, “Ann’s body may crave the nicotine and make Beth smoke more than usual”, “Beth decides when to have a cigarette, but the body will tell Beth it wants cigarettes more often”).

analysis above does not reveal which model of mind transfer that participants spontaneously used. Either fusion (with Beth's mind fusing with Ann's to produce behaviours not expected from either independently) or displacement (with Beth's mind displacing Ann's and thereby producing Beth-like behaviours) could account for the pattern observed. To discriminate between these alternatives, responses for the five mental items were recoded into three categories: complete displacement (identical with Beth), fusion (somewhere between Beth and Ann or summing Beth and Ann), and non-transfer (identical with Ann). On the above maths item, for example, a response of 2 (Beth typical) was categorised as a complete displacement, a response of 6 (Ann typical) was categorised as non-transfer, and all other responses were categorised as fusion (thereby including both averaging and additive fusions). As non-transfer (i.e. no effect) responses were extremely rare (4 out of a total of 125 cells) and not of theoretical concern, this category was omitted from the analyses. Hence, each response on each item was scored one for displacement or zero for fusion.

Averaging across the five mental items yielded scores for each participant ranging from zero to one. A one-sample t-test comparing the five item mean to 0.5 suggests a significant tendency toward displacement, $t(24) = 2.87, p = .008, M = .69, SD = .33$.

But how many participants consistently favoured displacement responses across all five mental items, and how many participants were consistent 'fusers'? To answer this question we categorized participants as 'fusers' if they gave fusion responses on four or more of the five items, 'displacers' if they gave four or more displacement responses, and 'neithers' for all others. This coding scheme revealed 15 displacers, four fusers, and six neithers. Of those participants that employed a consistent strategy for the mind items, there were significantly

more displacers than fusers, $X^2(1, N = 19) = 6.37, p = .012$.⁸ Of the six participants who could not be classified using the strict criterion, four showed displacement responses for a majority of their answers and two gave fusion answers most frequently. In sum, 19 participants gave displacement answers most frequently and six gave fusion answers most frequently.⁹ No significant sex differences were detected.

An item analysis shows displacement was the preferred strategy for all five mental scenarios, and a binomial test indicated that displacement was significantly favoured over fusion for items 8 and 10, $p = .023$ in both items.

What we observe so far, then, is the following:

- 1) When considering the effects of a mind transfer scenario, participants do not appear to answer randomly but in fact employ differing strategies depending on whether they are reasoning about mental or physical capacities.
- 2) Participants reasoned that the transfer would affect behaviours with a strong mental component (e.g. mathematical ability); but have little or no impact on behaviours with a strong physical or biological component (e.g. visual acuity).

⁸ The strategy of the ‘fuser’ could be a negative one rather than a positive one. That is, a ‘fuser’ could be simply avoiding either Ann-like or Beth-like responses, rather than actually representing mind-transfer as two minds fusing. It may be that fusers’ strategy may be to choose any of the five points on the scale that are not Ann or Beth-typical scores. There were too few ‘fusers’ to detect any such trends (whether negative, additive, or averaging).

⁹ It is important to note that answers coded as ‘fusions’ do not distinguish between mind-mind fusion and mind-body fusion. If a participant offered a response for a mental item that falls somewhere between Ann-typical and Beth-typical scores, this may have been due to perceived bodily, not mental, influence of the host person (Ann). Participant explanations indicate that participants frequently reasoned in terms of mind-body fusion. For example, in the food preferences item, a response coded as ‘fusion’ was followed by “Her mind tells her one thing and her taste buds another so she orders equal amounts of both”; and in the maths aptitude scenario, another ‘fuser’ explained, “I don’t believe it’s just the mind that is responsible for success in examinations”.

- 3) Further item and participant analyses demonstrated that participants were significantly more likely to reason consistently in terms of complete displacement and not fusion when considering post-transfer mental capacities.

These results suggest a tentative conclusion. Northern Irish young adults tend to spontaneously infer that when one person’s mind is transferred into another person’s body, the normal ‘host’ mind is displaced. Displacement was spontaneously inferred significantly more frequently than fusion, even though both options were equally available as valid responses. This suggests that participants’ responses were guided by a tacit one mind-one body principle. This conclusion is supported further by participants’ explicit reasoning for their choice of response. Participants appeared to assume this principle implicitly, with few actually explicitly spelling it out as a prior assumption that evidently guides their reasoning. Table 3 lists characteristic participant explanations for their answers. Consistent with the quantitative results, these explanations reflect a displacement mental model.

<<Insert Table 3 about here>>

	Explanation
Maths aptitude	Beth’s mind isn’t very strong at maths so this would affect Ann’s performance as it isn’t Ann’s physical appearance that makes her good at maths.
	Beth’s mind is still there in Ann’s body – it is her mind that will help her answer the questions not her body so she still won’t do well.
	It’s her mind that answers maths problems, not body.
	Even in Ann’s body it’s still Beth’s mind.

	Her mind answers the questions, not her body.
	Mind and body are separate. Beth who is not good at maths will still not be good at [it] regardless of who's body her mind is in.
	Beth who is poor at maths now has her mind in Ann's body and therefore Ann cannot excel
Story-telling	Beth's mind is telling the story
	Even in a different body Beth still has the same mind and still will continue to tell stories well.
	Mental abilities and imagination are areas controlled by the mind.
	Imagination is in the mind so it travels with Beth's mind into Ann
	Beth's mind, not Ann's body, told the story
	It's Beth's mind, therefore Beth's storytelling abilities: mental rather than physical attribute.
Sociality	Your body has nothing to do with how sociable you are so she probably still only talked to the 10 people
	Personality is to do with how confident a person is, this would be part of Beth's mind – her memories and traits, etc.
	Beth's mind would still be shy and unsociable and her mind would tell her she really wanted to talk to 10 (as usual)
	It will be Beth's mind so she will still be withdrawn and unsociable, but more people may try talking to her thinking she is Ann
	Confidence is in the mind and Beth is not very confident so if her mind is in Ann's body Ann cannot be confident

	Beth's mind will allow Ann's body to talk to 10 people
Emotional expression	Beth's mind wouldn't allow Ann's body to express emotions just as freely
	Beth's mind is in control of her emotions, being ins Ann's body will not affect this
	Beth's mind did not find the movie as emotional or exercised greater control over the reflex to cry
	Because emotion depends on the mind, not the body
	Beth's mind would not be inspired to cry more than usual because of a different body
	Beth's mind, not Ann's body, decides to cry
	Beth's mind tells Ann's body to cry just a little
Food preferences	Beth's mind would know what she was used to ordering
	Our favourite foods are based on associative experiences stored in the mind therefore a change of mind will cause a change in food favourites
	Mind controls favourite things and taste
	Beth's mind decides her likes and dislikes
	Because this is what Beth's mind likes, so that's what she'll order
	Beth prefers beans so now Ann's body has Beth's choice

Table 3. Participant explanations for displacement responses given for mental items (Study 1).

But might it have been possible that the strong effects observed were, at least in part, an artefact of a particular aspect of the experimental design? While the provision of scales is a

standard feature of questionnaires, perhaps exposing participants to a specified range of response options influenced response patterns in ways that open-ended questioning would not. Displaying the range of transfer options and labelling one as Beth-like behaviour in the preceding narrative may have subtly encouraged a displacement strategy. A second study was conducted to exclude this possibility.

Study 2

Method

Participants.

Participants were twenty-six undergraduate students (mean age, 20.1 years; 11 male, 15 female), again mainly drawn from the School of History and Anthropology and the School of Psychology at Queen's University Belfast. Standard compensation was provided for all participants. Participants were drawn from the same participant pool as Study 1 and randomly assigned to one study or the other.

Materials and Procedure.

The script followed the same content and structure as in Study 1, with only the response mode being altered from forced-choice to open-question format. For example, in Scenario 1, described above, the question appeared as follows:

How well do you think the girl will do on the maths test?

___ points.

Results and Discussion

As with Study 1, responses for each item were transformed to a Beth-Ann scale (Beth-typical scores equal 0, Ann-typical scores equal 1, with intermediate and additive scores falling between or outside this scale). Once again a paired-samples t-test of the mean responses yielded a significant difference between the five control and five cognitive items, $t(25) = 9.50, p < .001$. A one-sample t-test comparing mean answers to 0.5 showed that participants significantly favoured Beth-typical responses on mental items, $t(25) = 11.42, p < .001$ and Ann-typical responses on control items, $t(25) = 4.32, p < .001$. Furthermore, all five mental means were once again lower than all five control means, see Table 4.

<<Insert Table 4 about here>>

	Item #	Mean	SD
Control	2	.58	.40
	4	.90	.20
	6	.82	.38
	7	.75	.35
	9	.13	.25
	<i>Group Mean</i>	.64	.16
Mental	1	.19	.41
	3	.06	.18
	5	.21	.36
	8	.05	.28
	10	.05	.10

	<i>Group Mean</i>	.12	.17
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Table 4. Mean scores and standard

deviations by item and by group (control

and mental) for Study 2.

Responses were recoded into displacement, fusion and non-transfer categories as in Study 1, with displacement items scoring 1 and fusion items scoring 0. Non-transfer was again omitted from the analyses (6 responses out of a total of 130 were non-transfer, i.e., Ann-like). Following recoding, a one sample t-test was run on the five mental items' mean. Again, this showed a significant tendency toward displacement, $t(25) = 6.28, p < .001, M = .82, SD = .26$. (An independent samples test for equality of means showed no significant intergroup difference between Study 1, $M = .69$, and Study 2, $M = .82$.)

As in Study 1 significantly more participants met the conservative criterion for displacers than fusers. Indeed, in this study, no participants offered fusion responses for 4 or 5 of the 5 items. A total of 15 participants consistently offered displacement responses (i.e. in 4 or 5 of the 5 items), and 11 participants were neither displacers nor fusers according to our criteria. Of these 'neithers,' eight used displacement most frequently, and two used fusion. Of the participants that apparently employed a model of mind transfer for the mental items, there were significantly more displacers than fusers, $X^2(1, N = 15) = 15, p < .001$. Again, no single item alone accounts for the results. A binomial test indicated that displacement was significantly favoured over fusion for all five mental items, $p < .001$ for items 1,2 and 8; $p = .002$ for item 3 and $p = .011$ for item 10.

Unlike Study 1, Study 2 had enough males to detect possible sex differences. When transforming responses onto a zero (Beth-like) to one (Ann-like) continuous scale, males scored higher (i.e., more Ann-like), $M = .22$, $SD = .21$, than females, $M = .04$, $SD = .08$, on mental items, $t(24) = 3.09$, $p = .005$. No significant difference was detected for control items. Only two of eleven males met the criterion for ‘displacers’ with nine failing to meet the standard for displacers or fusers; whereas thirteen of the fifteen females were ‘displacers.’ Nevertheless, six of the nine unclassified males used displacement most often and only two used a fusion strategy most often. Summing across both studies, thirteen of sixteen males favoured displacement answers. Only two used fusion a majority of the time. These totals are proportionate to the female totals of twenty-nine favouring displacement and six using fusion most frequently. Consequently, drawing conclusions from the detected sex difference appears premature.

Study 2, therefore, replicated the findings of Study 1. Indeed, if anything, the absence of a scale may have enhanced the displacement effect, with participants significantly favouring displacement over fusion on all items and not a single participant consistently employing a fusion strategy across mental items.

General Discussion

Undoubtedly many factors influence the generation and spread of possession concepts, and variably enhance and inhibit the transmission of different versions encountered cross-culturally. The particular puzzle we began with here, however, was reformed as a set of empirical questions amenable to experimental investigation. The problem was threefold:

Why is the displacement concept of possession the most pervasive across different cultural contexts? Why is it offered as a possession description even in those contexts where it contravenes authoritative teachings? Why does it persist even where it becomes logically untenable in the light of other known facts about the possession situation?

Previous research has demonstrated that minds and bodies may be readily and intuitively conceived as existing apart from one another. This early-emerging cognitive foundation may be developed into many manifestations of dualist thought that are readily observable in everyday life, in film and comedy,¹⁰ and perhaps most notably in many religious beliefs. This research suggests that possession concepts – both of the ‘fusion’ and the ‘displacement’ variety, as well as ‘oscillation’ – also build upon this intuitive foundation. Intuitive dualism does not, however, provide ready answers to the above questions concerning the persistence and pervasiveness of displacement concepts over fusion concepts. Other than the intuitive conceptualisation of mind and body as discreet, autonomous entities, what additional assumptions guide the wide range possible conceptual configurations of minds and bodies in space and time? The results of the two studies reported here demonstrate a predisposition toward displacement of minds in mind-transfer situations, not fusion. The theoretical possibility of fusion is repeatedly rejected, while displacement is embraced. Participants’ explanations for their responses indicate that this rejection is guided by a tacit one mind-one body principle.

The present experimental evidence shows that displacement is not just a readily produced spirit possession model, it is a readily produced mind transfer model outside of religious

¹⁰ See Bloom 2004, for example, on slapstick humour (Chapter 6).

contexts and across culture. Ethnographic evidence demonstrates that displacement is more cross-culturally recurrent than other spirit possession models, and appears even when experience and expert instruction teach against such a model. Displacement might persist for several reasons including its memorability, the relative ease with which it generates inferences, and how easy it might be to explain and communicate to others. But a likely reason for its robustness underlying these other possibilities is that displacement might fit more readily with intuitive cognition governing the nature of minds. Children, irrespective of cultural context, may acquire an understanding that minds and bodies are distinguishable and operate under different causal principles. So says intuitive dualism. But further, children's naïve theories about human minds may include a tacit assumption that one and only one mind accounts for the behaviours of one and only one body. And perhaps this computationally elegant 'one mind-one body principle' persists into adulthood. If so, fusion and oscillation models of spirit possession, which assume one body is fully or intermittently under the control of two minds, would be less likely to be spontaneously produced.

It would be premature at this stage to conclude that the 'one mind-one body principle' is the decisive factor in the transmission of displacement concepts about possession. These results are certainly suggestive that, all else being equal, fusion is not a naturally occurring description of possession by spirits. Nevertheless, several important questions remain. Some of these relate to associated factors, such as memorability and inferential potential of ideas about fusion and displacement possessions, not directly investigated here.¹¹

¹¹ Boyer and others have suggested that 'minimally counterintuitive' concepts may be understandable, interesting, and hence, more likely to be transmitted than other comparable concepts (Barrett & Nyhof, 2001; Boyer, 2001; Boyer & Ramble, 2001). In contrast concepts that run too counter to intuitive assumptions of early-developing cognitive architecture often prove conceptually cumbersome, hard to use, remember, and

The nature of the apparent natural tendency to reason in terms of displacement in mind-transfer situations also requires further investigation. A key question raised by these studies concerns whether the one mind–one body principle is driven by participants’ intuitions about their physical world (i.e. intuitive physics) or about their social world (i.e. intuitive psychology). By positing that a mind may be manhandled from one body into another, does the very situation of a hypothetical mind transfer trigger expectations of a physical nature to do with solidity, cohesiveness, and contact? If the ‘mind’ here is triggering intuitive physical expectations in much the same way as ‘brain’ or ‘liver’ might, then this could explain the strong displacement (i.e. transplant) effect. These considerations are potentially relevant for our attempts to explain the transmission of possession concepts. According to the displacement view, possession is not normally conceived as a ‘mind’ occupying a body, but as a bodiless person occupying a body. Person, here, represents the “you” behind your eyes, mentioned earlier, and is not easily tracked by any available vocabulary, such as “mind” or even “person”. Difficulties with terminology notwithstanding, follow-up studies are required that disambiguate these possible interpretations and that detail the amorphous nature of the entity being transferred.

Certainly there is much to explore in this area, not only in relation to the transmission of possession concepts, but also in relation to the transmission of variable ideas about persons and their constituent parts. The ethnographic literature on such ideas presents a plethora of

transmit. Perhaps the idea of one mind or spirit displacing another is ‘minimally counterintuitive,’ whereas the notion of one mind or spirit entering the body of another and merging with the host mind to form a new person with distinct traits and attributes is too counterintuitive to be a strong candidate for replication within and across cultural groups.

detailed descriptions of “heart souls”, “head souls”, “person doubles”, “shadows”, “breaths”, and so on. In some places, persons are believed to be made up of many different parts, of which the body is the only physically instantiated component. Can these people be said to have a dualistic perspective of the person? Further cross-cultural and developmental experimental studies will enable us to better understand and explain the spread of such ideas, as well as identify and characterise forms of thinking, and the cognitive mechanisms that underpin them, that are truly pan-human.

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Appendix

The Person Transfer Task below is the script used in Study 1. Ample space was left after each item for participants to provide explanations for their answers. The script used in Study 2 was the same as Study 1 except for the response mode. Rather than use a scale, Study 2 provided a space for participants to respond freely.

Person Transfer Task

Please read the following scenarios and answer the question attached to each. All scenarios involve a hypothetical person transfer, in which one person's mind is (successfully) transferred into another person's body. Given this person transfer situation and some basic information about the two characters, a simple question is then asked regarding the new person's behaviours. Please indicate your response as instructed. For every other response, we ask you to offer a brief explanation for your answer. A space is left for optional explanations for your responses to the remaining questions.

All scenarios involve two fictitious people called Ann and Beth.

Scenario 1

Ann is very good at maths. She regularly gets excellent marks on 7-point quizzes – usually around 6 out of 7 of her answers are correct.

Beth is very poor at maths. She regularly gets poor marks on 7-point quizzes – usually around 2 out of 7 of her answers are correct.

Once when the girls were in maths class, somehow Beth's mind went into Ann's body. How well do you think that the girl will do on the maths test?

Please circle your answer.

1 2 3 4 5 6 7

Please offer a brief explanation for your answer:

Scenario 2

Ann has a big appetite. She eats around 3400 calories of food each day.

Beth has a small appetite. She eats around 1800 calories of food each day.

One day, Beth's mind went into Ann's body. How many calories do you think the girl ate that day?

Please circle your answer.

1400 1800 2200 2600 3000 3400 3800

Scenario 3

Ann is a very poor storyteller. Her young nephew tells her so. Whenever she visits him, he demands that she invent a story on the spot and tell it to him. Afterward, he gives her a rating of one through

to seven stars for the quality of the story. Ann's storytelling abilities never seem to improve - he almost always gives her two stars.

Beth is a very good story teller. Her young nephew tells her so. Whenever she visits him, he demands that she invent a story on the spot and tell it to him. Afterward, he gives her a rating of one through to seven stars for the quality of the story. Beth's stories are consistently great – he almost always gives her six stars.

Once when Ann had gone to visit her nephew, somehow Beth's mind went into Ann's body. The girl told a story. How many stars did it receive?

Please circle your answer.

1 2 3 4 5 6 7

Scenario 4

Ann is not very strong. She can lift 40 kgs.

Beth is quite strong. She can lift 80 kgs.

One day just before Ann was going to try to lift weights, Beth's mind went into Ann's body. How much was the girl able to lift?

Please circle your answer.

30 40 50 60 70 80 90

Scenario 5

Ann is quite outgoing and sociable. For instance, if she goes to a party with around 40 people at it, she'll talk to around 30 people.

Beth is quite withdrawn and unsociable. For instance, if she finds herself at a party with around 40 people at it, she'll talk to about 10 different people.

Once, when Ann went to a party with about 40 people at it, Beth's mind went into Ann's body. How many people do you think the girl talked to?

Please circle your answer.

5 10 15 20 25 30 35 40

Scenario 6

Ann has great eyesight. She can read down to the sixth row on an eye chart.

Beth has poor eyesight. She can read down to the second row on an eye chart.

Once when Ann went to have her vision tested, Beth's mind went into Ann's body. To what row on the eye chart could the girl read?

Please circle your answer.

First Second Third Fourth Fifth Sixth Seventh

Scenario 7

Ann is really fast. She typically runs 50 meters in around 6.0 seconds.

Beth is not so fast. She typically runs 50 meters in around 8.0 seconds.

One day as Ann was about to race the 50-meter sprint, Beth's mind went into Ann's body.

What do you think the girl's time was?

Please circle your answer.

5.5 6.0 6.5 7.0 7.5 8.0 8.5

Scenario 8

Ann expresses her emotions very freely. When she watches sad or touching movies, she cries almost the whole time.

Beth does not express her emotions very freely. When she watches sad or touching movies, she might just cry a little.

Once when Ann went to see a sad movie, somehow Beth's mind went into Ann's body. For how much of the movie do you think the girl cried?

Please circle your answer.

Not at all / Just a little / A fair amount / About half / More than half / Almost the whole time / The whole time

Scenario 9

Ann is quite a heavy smoker. She smokes around 25 cigarettes a day.

Beth is not a heavy smoker. She smokes around 5 cigarettes a day.

One day, Beth's mind went into Ann's body. How many cigarettes do you think the girl smoked that day?

Please circle your answer.

0 5 10 15 20 25 30

Scenario 10

Beth and Ann have the same favourite restaurant called Friar's Bistro. At Friar's Bistro, where both girls eat daily, beans and potatoes come with the main course. Customers can have as many beans and potatoes as they like.

Ann loves potatoes. She typically eats 6 scoops of mashed potatoes and 2 spoonfuls of beans.

Beth loves beans. She typically eats 6 spoonfuls of beans and 2 scoops of mashed potatoes.

One day, when Ann went to Friar's Bistro, Beth's mind went into Ann's body. How many beans and potatoes did the girl eat?

Please circle your answer.

Potatoes (Scoops): 1 2 3 4 5 6 7

Beans (Spoonfuls): 1 2 3 4 5 6 7